

Review Article

Postpartum care for hypertension prevention in women with a history of preeclampsia: A systematic review

Tiyas Kusumaningrum^{1*} , Nursalam Nursalam¹ , Mira Triharini¹ , Domingos Soares² 

ABSTRACT

Introduction: Preeclampsia is a risk factor for maternal hypertension, including postpartum hypertension. However, postpartum hypertension is often missed, due to the suboptimal quality of postpartum care and the lack of follow-up in women with a history of preeclampsia. Objective: This systematic review aims to synthesize and evaluate existing interventions for preventing postpartum hypertension in women with a history of preeclampsia, using a narrative synthesis approach to assess their effectiveness and methodological quality.

Methods: This systematic review used articles from Scopus, CINAHL, and PubMed. The search focus was postpartum care for hypertension prevention, particularly in women with a history of preeclampsia. Articles published between 2019 and 2024 were selected based on predefined eligibility criteria. We selected fully accessible articles that focused on postpartum care. The keywords used in the article search were “history of preeclampsia” OR “hypertensive disorder during pregnancy” AND “postpartum” AND “hypertension.” The selected articles came from various countries in five continents (Asia, Africa, Europe, America, Australia, and Europe). The selection process adhered to the Preferred Reporting Items for Systematic Reviews (PRISMA) guidelines.

Results: There were 28 articles reviewed. Postpartum care involving education and regular follow-up increased knowledge and ability to control hypertension risk in women with a history of preeclampsia. There were six articles involving participants performing blood measurements independently and reporting them through an online application or in a text based format.

Conclusion: This review confirms that women with a history of preeclampsia, especially severe preeclampsia, are at higher risk of postpartum hypertension. Tailored postpartum care is needed to mitigate the risk of postpartum hypertension and reduce rehospitalization. Continuous follow-up by health workers, either through face-to-face or telehealth monitoring, is important to ensure that mothers receive information and support in managing hypertension risk.

Keywords: hypertension; postpartum care; preeclampsia; prevention; telehealth

INTRODUCTION

Preeclampsia during pregnancy is one of the contributing factors to the development of hypertension in women, including during the postpartum period (Amiri et al., 2019; Behrens et al., 2017; Choi et al., 2022; Fant et al., 2023). Preeclampsia is characterized by endothelial dysfunction, leading to vascular stiffness and impaired organ vascularization, which may persist beyond pregnancy and result in postpartum hypertension (Galaviz-Hernandez et al., 2019; Ntlemo et al., 2021; Rana et al., 2019). Women with a history of preeclampsia often do not report hypertension due to its asymptomatic nature, and postpartum hypertension is more commonly recognized when they require rehospitalization due to severe hypertension symptoms (Ackerman-Banks et al., 2022; Fant et al., 2023; Girsen et al., 2022; Goel et al., 2015; Sibai, 2012).

A multicenter study conducted in seven tertiary referral hospitals in Indonesia (Medan, Bandung, Semarang, Solo, Surabaya, Bali, and Manado) identified 1,232 cases of preeclampsia within one year, with 11.9% of affected mothers requiring Intensive Care Unit (ICU) admission. The primary complications observed were HELLP syndrome and pulmonary edema (Akbar et al., 2018). Levine et al. (2016) found that more than 20% of postpartum women with a history of preeclampsia experienced persistent hypertension. The study also noted that the coverage of postpartum visits was only 52.3%, suggesting that the actual number of postpartum women with persistent hypertension may be higher than reported. Another study similarly indicated that only about 50% of women with a history of preeclampsia attended postpartum visits, with a tendency for those with severe preeclampsia to be more likely to seek follow-up care. This leads to the potential morbidity in women, particularly those with a history of preeclampsia, going unrecognized.

Postpartum care for the prevention of hypertension in women with a history of preeclampsia is crucial, as it reduces the risk of morbidity and mortality. However, there are no definitive recommendations for postpartum care in hypertension prevention for this population. This systematic review aims to explore existing approaches to postpartum care for preventing hypertension in women with a history of preeclampsia.

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*Correspondence: Tiyas Kusumaningrum (tiyas-k@fkip.unair.ac.id)

¹Faculty of Nursing, Universitas Airlangga, Surabaya, Indonesia

²Instituto Nacional de Saude Publica Timor-Leste, Dili, Timor-Leste

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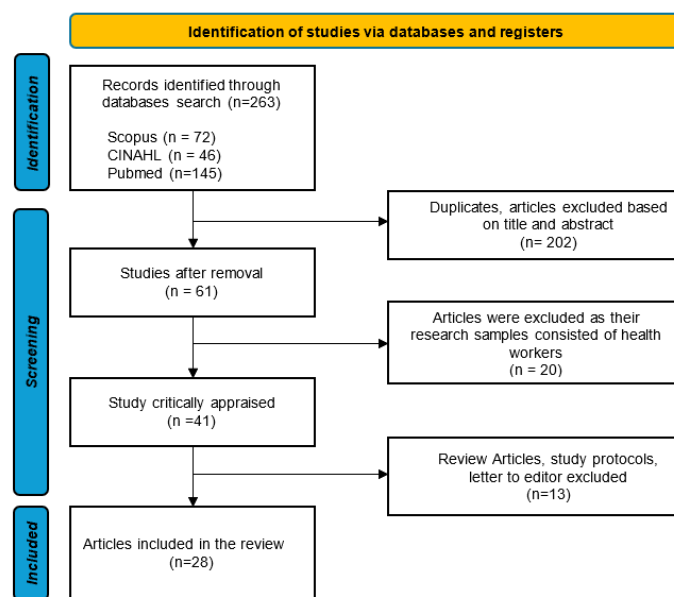


Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA)

Table 1. PICOS Criteria

PICOT Framework	Inclusion criteria	Exclusion criteria
Population	Postpartum woman, woman	Children, teenagers
Intervention	Education, counselling, follow-up, monitoring, exercise	Does not discuss hypertension prevention
Comparison	No treatment, standar treatment	N/A
Outcome	Hipertension prevention, postpartum care	N/A
Study design	RCT, quasi-experiment, cohort study, qualitative study, mixed methods, case-control	Article review, study protocols
Publication year	2019—2024	N/A

Note: RCT: Randomized Controlled Trial; N/A: Not Applicable

METHODS

Study Design

This systematic review synthesized relevant research articles on hypertension prevention interventions in postpartum women with a history of preeclampsia, following the PRISMA checklist and Mixed-Methods Appraisal Tool (MMAT) for evaluation and study selection.

Search Strategy

To gather data, a systematic search was conducted across reliable databases, including Scopus, CINAHL, and PubMed. The reviewed articles were limited to publications from 2019 to 2024, accessible in full text, and focused on postpartum care. The keywords used were “history of preeclampsia” OR “hypertensive disorder during pregnancy” AND “postpartum” AND “hypertension.”

Study Selection

At the initial search, 263 articles were identified. The inclusion criteria encompassed all articles that study interventions and postpartum care related to hypertension prevention. The relevance of the articles was evaluated using the PICOS format, with the specific PICOS criteria outlined in Table 1.

Data Extraction

Screening was conducted to identify titles and abstracts

that met the inclusion criteria. The data collected from the reviewed articles included authors, publication year, country, number of participants, intervention, control, and results.

Risk of Bias

All reviewed studies underwent a critical appraisal process. Randomized controlled trials (RCTs), quasi-experimental studies, prospective and retrospective cohort studies, cross-sectional studies, qualitative studies, and case-control studies were appraised using the checklist from The Joanna Briggs Institute (JBI). Criteria were assessed using the ratings “yes,” “no,” “unclear,” or “not applicable.” For studies using a mixed-methods approach, the critical appraisal followed the format of the Mixed-Methods Appraisal Tool (MMAT), with rating criteria of “yes,” “no,” or “can’t tell.”

Quality Appraisal

The evaluation follows the JBI critical appraisal checklist, with study scores as follows: 10/13 for RCT and quasi-studies, 10/11 for cohort studies, 7/8 for cross-sectional studies, and 10/10 for both qualitative studies and case-control study. A comprehensive evaluation of the methodological quality of the mixed-method studies included in the review, utilized MMAT version 2018 based on Hong *et al.* (2018). The MMAT scores for reviewed mixed-method studies were 5/5.

Data Analysis

Four reviewers conducted qualitative reviews and discussions on selected studies. The results were integrated based on the

Table 2. Studies included in the systematic review

No	Authors (year)	Study	Intervention	Findings
1	Kordvarkane et al., (2023)	RCT	The intervention provided was training for hypertensive patients based on the Common-Sense Model of Self-Regulation (CSM). The training consisted of five sessions that taught participants about disease cognition. The five components of disease cognition included the description of nature, symptoms, and causes; consequences; duration; and methods of control and care for the disease. During the intervention, participants received follow-up calls every three days. Self-management ability and blood pressure levels were measured at the end of the intervention. The control group continued to receive routine education at healthcare facilities.	The study results indicate that the training program, which incorporated an educational component and was structured based on the Common-Sense Model of Self-Regulation (CSM), effectively reduced blood pressure and improved self-management behavior in hypertensive patients. The mean systolic blood pressure was 116.21 ± 14.52 mmHg in the intervention group compared to 128.62 ± 16.88 mmHg in the control group, the mean diastolic blood pressure was 73.93 ± 7.15 mmHg compared to 82.25 ± 9.72 mmHg, and the mean arterial pressure (MAP) was 88.03 ± 8.47 mmHg compared to 98.11 ± 11.69 mmHg. This study provides insights into the application of the Common-Sense Model of Self-Regulation (CSM) in behavior modification and training, as well as its relationship with blood pressure and self-management in the care of hypertensive patients, particularly women.
2	Saranjam et al.,(2023)	RCT	The intervention group participated in a five-week program, with weekly 60-minute sessions focusing on different objectives. The sessions aimed to enhance patients' understanding of illness identity, causes, and the impact of hypertension on their lives. They also addressed disease consequences, duration, personal and treatment control, illness coherence, and the importance of avoiding harmful substances. Additionally, the program emphasized psychological, spiritual, and social health, weight control, nutrition, physical health, exercise, fitness, environmental health, and accident prevention.	The self-regulation intervention based on Leventhal's theory led to a significant improvement in nearly all parameters of illness perception ($p < 0.05$), with the exception of Emotional Representation and Consequences. This suggests that while the intervention effectively enhanced patients' understanding of their condition and self-management abilities, emotional and perceived long-term consequences of the disease may require additional targeted strategies. Moreover, the intervention contributed to a substantial improvement in overall lifestyle behaviors, as evidenced by the significant increase in the global mean lifestyle score of hypertensive patients. Notably, positive lifestyle modifications were particularly evident in the domains of exercise and fitness, highlighting the intervention's effectiveness in promoting healthier physical activity habits and overall well-being.
3	Arkerson, B. J. et al. (2023)	RCT	The intervention group, consisting of women with a history of hypertension during pregnancy, was instructed to perform daily self-monitoring of blood pressure for up to 16 days after hospital discharge. Each patient was provided with a personal blood pressure monitor and required to install a mobile application on their smartphone. All blood pressure readings were recorded in the application, which was linked to a web-based database monitored by the research team. Any detected increase in blood pressure was identified through the web platform, triggering a consultation via telephone with an obstetrician-gynecologist. Based on the consultation, patients diagnosed with hypertension were either prescribed antihypertensive medication or advised to visit an obstetrics and gynecology clinic if deemed necessary by the physician	There was a significant difference in adherence to blood pressure monitoring between women who received remote monitoring intervention and those who underwent in-office monitoring. Women in the remote monitoring group demonstrated higher compliance (P -value = 0.007). Similarly, clinic visits related to hypertension management were more effective among those who participated in remote monitoring. These findings support the recommendation of telehealth interventions for women in the intervention group as a strategy to prevent hypertension-related complications. Additionally, participants in the intervention group expressed a preference for home-based blood pressure monitoring over clinic visits.
4	Riemer, M. et al. (2021)	RCT	The study participants were postpartum women. The intervention group received nutrition counseling three times—at hospital discharge, at six weeks postpartum, and at 32 weeks postpartum. The nutrition counseling was combined with an intensive six-month cardiovascular exercise program. Meanwhile, the control group received nutrition counseling only once	The study findings revealed that the integration of nutrition counseling and a structured cardiovascular exercise program led to a significant reduction in aortic pulse wave velocity (aPWV) and lactate threshold. These changes indicate improved arterial elasticity and enhanced physical endurance, both of which are critical factors in cardiovascular health. The observed benefits suggest that this combined intervention may play a crucial role in reducing the long-term risk of cardiovascular complications in postpartum women.

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No	Authors (year)	Study	Intervention	Findings
5	Kitt, J. A. et al. (2021)	RCT	Participants were randomly assigned to either a control group receiving standard postpartum care or an intervention group enrolled in the SNAP-HT Trial. The intervention group conducted periodic self-monitoring of blood pressure, recording their readings via a smartphone app linked to the SNAP-HT Trial server. A telemonitoring system provided reminders for missed measurements, and participants adjusted their antihypertensive medication independently with telemonitoring guidance.	The data analysis results showed that women who self-managed their blood pressure (BP) postpartum in the SNAP-HT randomized controlled trial had a lower 24-hour diastolic BP of 73.7 ± 5.0 mm Hg compared to 80.7 ± 7.4 mmHg in the usual care group. Among various factors such as age, parity, BMI, activity levels, smoking rates, alcohol intake, waist-to-hip ratio, and arm circumference, only salt intake showed a significant association with 24-hour diastolic BP. The study also revealed that, compared to the control group, the intervention group demonstrated better medication adherence, resulting in a lower rate of rehospitalization.
6	Rajabloo, Mohammadpour and Sajjadi, (2021)	Quasy Experiment	This quasi-experimental study divided hypertensive patients into a control group receiving standard care and an intervention group undergoing a Leventhal model-based intervention. The intervention included three weekly face-to-face training sessions covering hypertension's nature, risk factors, and management beliefs, followed by a booklet to correct misconceptions. Participants also received follow-up phone calls for eight weeks post-intervention.	In this study, no significant differences were observed between the pre-test and post-test results in the control group, whereas the intervention group showed notable improvements. Significant differences were found in medication adherence, salt intake, and clinical visits for hypertension monitoring. Changes were also evident in systolic and diastolic blood pressure between pre-test and post-test measurements. A comparative analysis of post-test results between the intervention and control groups revealed significant differences across all parameters.
7	Moustafa, A. S. Z. et al. (2024)	Prospective cohort	Postpartum women participating in the study received a Systematic Treatment and Management of Postpartum Hypertension (STAMPP HTN) package, which included a blood pressure monitor, baby diapers, baby wipes, educational materials, an educational card, and a preeclampsia wristband. Before receiving education, participants completed a pre-education survey and were then asked to watch an educational video about preeclampsia. Following the video, they were trained to use the blood pressure monitor and record their measurements. From hospital discharge up to six weeks postpartum, participants were required to measure and log their blood pressure independently. Additionally, the research team conducted follow-up phone calls if participants experienced hypertension. Any necessary treatment was prescribed by the attending physician.	The study results indicate that the STAMPP-HTN intervention improved participants' knowledge, but only 17.34% of participants answered correctly in the post-test. Younger participants were less likely to complete the full intervention (P -value = 0.03), although their knowledge levels increased after the post-test. Postpartum follow-up visits were attended by only 39.2% of participants. Adherence to the STAMPP-HTN intervention decreased as the postpartum period progressed for most participants. This study recommends exploring alternative education and monitoring methods beyond remote programs. Additionally, it highlights the importance of providing periodic education rather than limiting it to the early postpartum period to improve long-term engagement and knowledge retention.
8	Triebwasser, Janssen and Sehdev (2021)	Retrospective cohort	This study did not provide a specific intervention but rather investigated the implementation of counseling for postpartum women enrolled in a text-based blood pressure monitoring program. The program included the provision of an automatic blood pressure monitor, text message reminders prompting patients to measure their blood pressure, and self-monitoring with reporting via text messages. Researchers identified and analyzed postpartum visit reports to determine whether patients received counseling on hypertensive disorders of pregnancy during their follow-up visits.	The study results showed that 89% of the 284 scheduled participants attended their postpartum visits. Postpartum women were managed by resident physicians, nurses, midwives, and attending physicians. Most cases involved gestational hypertension (gHTN) or preeclampsia (PEC) without severe features, with these conditions occurring in more than 50% of participants in both the counseling and non-counseling groups. Only 21.8% of participants received counseling, with attending physicians being the primary providers. Less than 10% of participants were counseled on transition of care, cardiovascular disease (CVD) risk, and aspirin use for future pregnancies. Compared to counseling on hypertensive disorders of pregnancy and their implications, contraceptive counseling was provided more frequently.

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No	Authors (year)	Study	Intervention	Findings
9	Romagano et al. (2020)	Retrospective cohort	Postpartum women were scheduled for blood pressure evaluation (3–10 days after delivery) and a postpartum visit (3–4 weeks, up to 6 weeks postpartum). Women diagnosed with preeclampsia or chronic hypertension were provided with an automatic blood pressure monitor and instructed to measure their blood pressure twice daily, recording the results. Participants were required to bring their recorded measurements to their visits for blood pressure evaluation.	The study results indicated that among all participants scheduled for a blood pressure evaluation visit, 51.1% attended, while the remainder did not. Participants who attended the visit were more likely to be older, have delivered at an earlier median gestational age, experienced preeclampsia or severe preeclampsia, received antihypertensive treatment during hospitalization, and undergone cesarean delivery. Additionally, the study revealed that over 30% of those who did not attend had a history of gestational hypertension or preeclampsia, while more than 20% of participants with severe preeclampsia or severe-range blood pressure during hospitalization also did not return for blood pressure evaluation visits.
10	Lovgren, T. et al. (2023)	Retrospective cohort	This study investigated women diagnosed with peripartum hypertension over a four-year period, focusing on the incidence of hospital readmission within this population. The analysis included all readmissions related to hypertensive complications and preeclampsia, whether through the emergency room or other healthcare services. Participants were categorized based on their antihypertensive treatment regimen into those who received no medication, those treated with labetalol monotherapy, those treated with nifedipine monotherapy, and those who received a combination of labetalol and nifedipine therapy.	The study identified 4,660 women diagnosed with peripartum hypertension, accounting for 24% of all deliveries. Over the four-year period, 4.7% of these women experienced hospital readmission. A total of 66.7% of those diagnosed with peripartum hypertension were discharged with antihypertensive treatment, predominantly nifedipine monotherapy. Analysis revealed that nifedipine monotherapy was associated with a reduced risk of readmission, while labetalol monotherapy was linked to a higher likelihood of readmission. Women who received a combination of nifedipine and labetalol had a lower risk of readmission compared to those on labetalol alone.
11	Lewey, J. et al. (2020)	Retrospective cohort	The investigation focused on postpartum women and their utilization of postpartum continuity care follow-up within the recommended six-month postpartum period. This utilization was analyzed in relation to demographic variables (such as age, race/ethnicity, and education level), clinical comorbidities (including diabetes mellitus and heart failure), and obstetric factors (such as cesarean delivery and preterm birth).	The utilization of postpartum continuity care follow-up was found to be low among nearly all participants, except for those with a history of hypertensive disorders of pregnancy or chronic hypertension. The overall utilization rate was only 40% for both normotensive and hypertensive participants. An analysis of healthcare facilities visited for postpartum continuity care follow-up revealed that fewer participants sought care at primary care centers compared to other healthcare facilities. Additionally, the study found that participants aged ≥ 30 years were 1.2 times more likely to utilize primary care services than women's health services or other healthcare facilities.
12	Ntlemo, P., Cronje, T. and Soma-Pillay, P. (2021)	Prospective cohort	This study examined two groups of postpartum women: those with preeclampsia and those who were normotensive. All respondents from both groups were required to attend postpartum visits in the first and sixth weeks after childbirth. Data collection was conducted at six weeks postpartum, including variables such as systolic and diastolic blood pressure, waist circumference, fasting blood glucose levels, triglycerides, and HDL cholesterol levels	The study revealed that loss to follow-up occurred only in the normotensive group. A significant difference in diastolic blood pressure was observed between the preeclampsia group and the control group after six weeks postpartum. A total of 81 participants were diagnosed with metabolic syndrome after childbirth. At six weeks postpartum, participants with confirmed metabolic syndrome experienced increases in blood pressure, waist circumference, and triglyceride levels. Low HDL levels were found in 18% of participants in the preeclampsia group, compared to 36.4% in the control group. Elevated blood glucose levels were more prevalent in the control group (15.2%) than in the preeclampsia group (6.3%)

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No	Authors (year)	Study	Intervention	Findings
13	Magnus, M. C. et al. (2023)	Prospective cohort	This study investigated the relationship between breastfeeding and cardiometabolic health in women, both with and without a history of hypertension during pregnancy. Participants completed questionnaires at 6 months and 15 months postpartum. After 18 years, clinical examinations were conducted, assessing body weight, height, waist circumference, blood pressure, fasting blood glucose, lipid levels, insulin, proinsulin, C-reactive protein (CRP), and carotid arterial distensibility.	This study revealed that the proportion of participants who breastfed in the group with a history of hypertension during pregnancy or preeclampsia was significantly lower (17.6%) compared to those without hypertension during pregnancy. A higher percentage of participants who did not breastfeed received antihypertensive medication compared to those who breastfed. Greater reductions in BMI were observed in participants who breastfed, with the degree of reduction linked to the duration of breastfeeding. Similar trends were observed in waist circumference, blood pressure, fasting blood glucose, lipid levels, insulin, and C-reactive protein (CRP).
14	Keepanasseril, A. et al. (2020)	Prospective cohort	Postpartum women underwent follow-up at 2 weeks and 6 weeks postpartum, as well as monthly while their blood pressure remained elevated. Antihypertensive medication was titrated based on their blood pressure readings and continuously monitored by local primary health centers. The follow-up period lasted for 12 months.	A total of 191 participants completed the full follow-up within three months. Upon hospital discharge, 103 participants required antihypertensive medication; however, by the third-month follow-up, only 27 continued therapy. Persistence of hypertension at three months was observed in 32 (18.1%) women. The most commonly prescribed antihypertensive medications were labetalol and amlodipine. Additionally, 1.1% of participants experienced hemiplegia due to stroke during the postpartum period, and 41.5% had abnormal serum creatinine levels. The high prevalence of abnormal serum creatinine levels suggests potential kidney dysfunction, possibly linked to hypertensive complications. Additionally, the occurrence of hemiplegia due to stroke underscores the severity of postpartum hypertension and its associated risks.
15	Jikamo, B. et al. (2022)	Prospective cohort	The follow-up program at the 6th and 12th weeks postpartum was implemented for women with and without a history of preeclampsia. During the follow-up, interviews were conducted using the WHOQOL-BREF questionnaire to assess their quality of life.	The study results indicate a significant difference in general quality of life measurements between participants with a history of preeclampsia and those without. Women who had experienced preeclampsia reported lower quality of life compared to those without such a history. This trend remained consistent at both the 6-week and 12-week postpartum follow-ups. Improvements in scores were observed across various domains, including general health condition, physical well-being, psychological well-being, social relationships, environmental factors, and overall health-related quality of life (HRQoL). The findings also revealed that by the 12-week follow-up, both groups—those with and without a history of preeclampsia—experienced an overall improvement in quality of life.
16	Scholz, A. S. et al. (2022)	Prospective cohort	This study examines the utilization of primary and specialized healthcare services, as well as medication patterns, among women who experienced preeclampsia. The assessment was conducted 7.5 years after childbirth complicated by preeclampsia.	The study data indicate that women with a history of preeclampsia had a higher prevalence of preexisting comorbidities. Compared to women in the normotensive group, those with a history of preeclampsia also experienced adverse events more frequently. The average number of visits to gynecologists and general practitioners remained relatively similar between the two groups after 7.5 years. However, a notable difference was observed in visits to internal medicine specialists, which began to increase in the fifth year postpartum and surged significantly at 7.5 years. The use of antihypertensive medications among women with a history of preeclampsia more than doubled over this period, with ACE inhibitors and beta-blockers being the most frequently prescribed medications.

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No	Authors (year)	Study	Intervention	Findings
17	Ackerman-Banks, C. M. et al. (2022)	Prospective cohort	Participants in the study underwent assessments between 6 and 12 months postpartum. The primary outcome targeted in the research was new-onset chronic hypertension (cHTN), defined as a systolic blood pressure >130 mmHg or a diastolic blood pressure >80 mmHg. Secondary outcomes included fasting lipid values, metabolic syndrome, prediabetes (hemoglobin A1c between $\geq 5.7\%$ and $< 6.5\%$), diabetes (hemoglobin A1c $> 6.5\%$), and the 30-year risk of cardiovascular disease	The 6–12 month assessment results indicated that participants with a history of hypertensive disorders of pregnancy (HDP), including preeclampsia, were more likely to experience elevated fasting blood glucose levels, a diagnosis of metabolic syndrome, and increased levels of low-density lipoprotein (LDL) and cholesterol. Compared to the normotensive group, those with HDP also exhibited higher HbA1C levels. These findings suggest that women with a history of HDP have a greater risk of developing cardiovascular disease (CVD).
18	Hacker, F. M. et al. (2022)	Prospective cohort	Postpartum women participating in the study were provided with written educational materials on postpartum preeclampsia. Following this, nurses conducted structured telephone interviews to assess postpartum issues such as mood and lactation. Participants were also screened for symptoms including headaches, shortness of breath, chest pain, difficulty breathing while lying flat, vision changes, worsening extremity swelling, and right upper quadrant or epigastric pain. Additionally, they were instructed to measure their blood pressure and report the readings via electronic messaging. If hypertension was detected, participants were advised to schedule a visit with their primary obstetrician or seek emergency care if their blood pressure exceeded 160/110 mmHg.	The study results indicate that 73.2% of participants experienced elevated blood pressure, with a mean systolic pressure of 141 ± 13.4 mmHg and a mean diastolic pressure of 93 ± 7.7 mmHg. More than half of those with increased blood pressure (59.8%) had at least one risk factor for postpartum preeclampsia. Additionally, 8.2% of participants were diagnosed with hypertension, and 0.7% developed severe hypertension requiring hospital referral. Seventeen participants were readmitted to the emergency department. Among those with elevated blood pressure, excessive pregestational and postpartum BMI or obesity was identified as a common factor. The study also revealed limitations in telephone-based monitoring programs, as participant engagement was not superior to that of text-based monitoring.
19	Sutherland et al., (2020)	Cross-sectional	Participants underwent follow-up assessments at baseline (after delivery) and three months postpartum. The follow-up was conducted through phone interview surveys, which covered aspects such as physical activity, risk perception, and healthcare utilization.	The demographic data of this study indicate that participants with preeclampsia tended to be younger, nulliparous, Black, and insured. Postpartum care visits were more frequent among participants with gestational diabetes compared to those with preeclampsia. There was no difference in emergency department visits between the groups. Compared to participants with gestational diabetes, those with a history of preeclampsia were more likely to report not receiving advice from healthcare providers regarding chronic disease risk. A high-risk perception was associated with a tenfold increase in the odds of scoring 9 or greater on the Edinburgh Postnatal Depression Scale (EPDS).
20	Burgess, Eichelman and Rhodes (2021)	Cross-sectional	The participants were women who gave birth to live infants between 2012 and 2015. Data collection was conducted through the Pregnancy Risk Assessment Monitoring System (PRAMS). Body Mass Index (BMI) data were obtained from self-reported height and weight provided by the respondents. Participants were categorized into two groups: those who experienced hypertension during pregnancy (HDP) and those who did not.	Participants in the group that experienced hypertension during pregnancy tended to be obese from the early stages of pregnancy. This group was also less likely to initiate breastfeeding or breast pumping compared to those who were normotensive during pregnancy. A total of 17.6% of participants reported that their healthcare providers did not discuss breastfeeding with them. Some reasons given for not practicing breastfeeding included illness, medication use, personal dislike of breastfeeding, unwillingness to breastfeed, and other factors such as being occupied with other children, household responsibilities, or finding breastfeeding too difficult. Some participants discontinued breastfeeding due to low milk production, an inability to produce milk, latch difficulties, and the perception that breastfeeding was too time-consuming.

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No	Authors (year)	Study	Intervention	Findings
21	Slater, K. et al. (2023)	Cross-sectional	This study is part of the longitudinal Australian Longitudinal Study on Women's Health (ALSWH), which surveys various aspects of women's health. It examines physical health and psychological well-being across different life stages by assessing demographic, social, biological, behavioral, psychological, and lifestyle factors. Additionally, it evaluates healthcare utilization and satisfaction. The study follows up on four generations of women in Australia, providing comprehensive insights into women's health trends over time	From the 5,820 women who responded to the survey, 755 participants had a history of hypertensive disorders in pregnancy (HDP). Compared to participants without a history of HDP, those with HDP reported difficulties in managing income, living outside major cities, and having lower levels of education. Participants with HDP had a BMI ≥ 25 kg/m ² (69.1%), engaged in physical activity of less than 600 MET min/week (44.1%), smoked or had a history of smoking (38.8%), and 27.4% had a CESD-10 (depression) score above 10. The results of the multinomial logistic regression analysis showed that, compared to participants without a history of HDP, those with a history of HDP had a 1.7 times higher risk of being overweight, a 3.1 times higher risk of obesity, and a 1.3 times higher likelihood of having a CESD-10 score greater than 10..
22	Arntzen, E. et al. (2023)	Qualitative	The intervention received by the participants was Mom's Healthy Heart (MHH), a lifestyle-focused intervention program for women during the postpartum period. The program was conducted over six months and included telephone counseling on physical activity, healthy diet, and motivation to adopt a healthier lifestyle. After completing the MHH program, participants were interviewed to assess their experiences and outcomes	An in-depth interview conducted with 17 participants resulted in five themes, each with 2–3 subthemes. The identified themes included: fear and uncertainty; a conversation on lifestyle – not really that difficult; when your own health is not a priority; motivation for lifestyle changes; and lack of structured and organized follow-up. Within the theme "fear and uncertainty," the subthemes were "a body out of balance" and "facing an uncertain future." For the theme "a conversation on lifestyle – not really that difficult," three subthemes emerged: "pre-eclampsia as a gateway," "a respectful approach," and "a desire for more constructive feedback." Under the theme "when your own health is not a priority," three subthemes were identified: "a new everyday life," "out of focus," and "lack of support." Regarding the theme "motivation for lifestyle changes," three subthemes were found: "an eye opener," "lack of intrinsic motivation," and "a helping hand." Finally, for the theme "lack of structured and organized follow-up," the subthemes included "there should be a proper system," "a one-sided focus in follow-up care," and "individual variation in follow-up care."
23	Silverio, S. A. et al. (2023)	Qualitative	The intervention provided to the research participants was the standard intervention applicable to postpartum women in the UK, which includes routine contact with clinicians or midwives within 6–8 weeks after childbirth. In addition to this standard intervention, participants may have been offered follow-up consultations with obstetricians or other healthcare professionals.	There were four main themes identified from the in-depth interviews conducted with participants who had a history of hypertension in pregnancy (HDP). These themes included: 1) Assumption about Blood Pressure; 2) Perinatal Experience; 3) Postnatal Care Pathway; and 4) Managing Complex Health Conditions. In the theme "Assumption about Blood Pressure," two subthemes emerged: "Women's Understanding of Hypertensive Symptoms and High Blood Pressure" and "Misinformation and Clarity around Hypertension Diagnosis." The theme "Perinatal Experience" encompassed three subthemes: "Poor Postnatal Experience of Clinicians" and "Emotional Well-being." For the theme "Postnatal Care Pathway," three subthemes were identified: "Hospital Admissions and Outpatient Management," "Primary and Community Care," and "Postnatal Counselling." Within the theme "Managing Complex Health Conditions," three subthemes were found: "Managing Co-morbidity," "Medication Needs and Requirements," and "Priority in Care."

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No	Authors (year)	Study	Intervention	Findings
24	Rossiter, C. et al. (2022)	Qualitative	The participants in this study were postpartum women who were divided into three different intervention groups. The first group received optimized usual care, which supplemented standard care for six weeks. The second group underwent a brief education intervention that included informational brochures and a consultation with a dietitian and physician in a specialized clinic six months postpartum. The third group participated in an extended lifestyle intervention, which included the brief education intervention along with a referral to a six-month lifestyle coaching service	The qualitative study involved 34 participants, with the majority coming from the Optimized Usual Care group (12 participants), while the second and third groups each had 11 participants. Following a series of interviews and thematic analysis, three main themes emerged. The first theme, "Awareness of cardiovascular risk: 'It makes you more high risk,'" included three sub-themes: "New knowledge from BP2 – 'I didn't know that before,'" "Stressful information – 'Knowing is scary,'" and "Awareness doesn't necessarily change behavior – 'I know what I'm meant to do.'" The second theme, "Sources of motivation to change behavior: 'Who am I changing for?'" consisted of four sub-themes: "My future health – doing it for me," "Baby/family as motivation – doing it for them," "My needs come last – certainly not doing it for me," and "Putting good health on hold – not doing much." The third theme, "Sustaining behavior change with a new baby: 'I do what is comfortable for me and with the time I've got,'" contained three sub-themes: "Adapting to new circumstances," "Value of BP2 and the Get Healthy Service," and "Taking what is given/need for structured follow-up."
25	Nuckols, V. R. et al. (2022)	Case-controls	This study compares blood pressure in women with a history of preeclampsia and those without by categorizing measurements into three types: office blood pressure measurement, ambulatory blood pressure measurement (ABPM), and home blood pressure measurement (HBPM). For ABPM and HBPM, participants received a series of instructions to independently measure their blood pressure using a designated sphygmomanometer	After comparing participants with and without a history of preeclampsia, significant differences were identified between the two groups. Across all three types of blood pressure measurement, hypertension was predominantly observed in the group with a history of preeclampsia. Hypertension was more frequently detected using the ABPM method compared to other measurement techniques. Among the three methods, HBPM most frequently identified masked hypertension in both women with and without a history of preeclampsia.
26	Cairns, A. E. et al. (2020)	Mix-method	The intervention applied to the participants was Self-Management of Postnatal Hypertension (SNAP-HT), which was implemented for those with a history of preeclampsia or hypertension during pregnancy. Participants were divided into two groups: usual care and blood pressure self-management. Participants in both groups were instructed to record their blood pressure measurements independently. They were then interviewed at four weeks postpartum and again at six months postpartum	The quantitative results from the semi-structured interviews indicated that in the pre-test, both groups felt they had more control during the postpartum period compared to pregnancy. However, scores related to this perception only increased in the intervention group (SNAP-HT) after the implementation of the intervention. There were no differences between the two groups regarding confidence in discussing with healthcare providers, the perception of shared responsibility for treatment with healthcare providers, and participants' level of knowledge about their condition. The qualitative findings identified six main themes: control; convenience; confidence, communication, and knowledge; concern; constraints; and components of the intervention. For the theme of control, participants expressed that self-management allowed them to have control over their condition. In the theme of convenience, self-management was seen as a convenient, flexible, and reactive intervention. In the theme of confidence, communication, and knowledge, participants felt that understanding their blood pressure measurements increased their confidence. Under the theme of concern, participants stated that self-management helped reduce their anxiety. For the theme of constraints, some participants reported increased anxiety, emphasizing the importance of maintaining contact with healthcare providers. Finally, in the theme of components of the intervention, the simplicity and ease of use of self-management contributed to adherence and the adoption of new behaviors.

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No	Authors (year)	Study	Intervention	Findings
27	Mooij, R. et al. (2021)	Mix-method	The participants were women with a history of severe preeclampsia who gave birth between July 2011 and December 2012. Data collection was conducted 6 to 7 years after the diagnosis was established. The aim of the study was to explore the consequences of severe preeclampsia on these women	Compared to the control group of women without a history of severe preeclampsia or eclampsia, those with a history were younger, experienced higher rates of fetal or neonatal loss (29% vs. 1%), had fewer pregnancies (3 vs. 4), and were more likely to suffer from hypertension, anxiety or depression, chronic pain, and difficulties in daily activities. Qualitative analysis identified four main themes: 1) A major life event with a profound impact; 2) Lasting symptoms; 3) Limitations in functioning; and 4) Ongoing worries. Most women with a history of severe preeclampsia described the condition as an intense and overwhelming experience, often leaving strong negative emotions, particularly for those who lost their babies. Many continued to experience symptoms long after hospital discharge, with some persisting for up to two years. Functional limitations were evident, as many struggled with household tasks and even faced financial difficulties due to their inability to work. A significant concern among these women was the fear of preeclampsia recurring in future pregnancies, while others felt pressured to conceive despite the risks due to societal expectations regarding childbearing. Additionally, many expressed a lack of adequate understanding of their condition and felt that healthcare providers did not provide sufficient information during or after their experience with severe preeclampsia.
28	Girsen, A. I. et al. (2022)	Retrospective cohort	This study involved participants who gave birth in California, investigating postpartum readmission and its association with conditions during labor and hospitalization. Data were collected from births occurring between 2007 and 2018	The study found that over 23,000 participants experienced postpartum readmission within 0 to 6 days after discharge (early readmission). A larger number of participants (24,712) were readmitted between 7 to 29 days post-discharge (later readmission). Severe preeclampsia was the strongest prenatal condition associated with early readmission (aOR=3.67; 95% CI) compared to later readmission (aOR=1.65; 95% CI). Other prenatal conditions linked to early readmission included major mental health disorders, bleeding disorders, preexisting diabetes mellitus, and thyroid disorders. Intrapartum conditions associated with early readmission included sepsis and severe maternal morbidity. Birth hospitalization factors linked to both early and later readmission included preterm birth before 34 weeks of gestation, cesarean delivery, postpartum hemorrhage, and prolonged birth hospitalization.

Note: RCT: Randomized Controlled Trial; CSM: Common-Sense Model of Self-Regulation; aPWV: aortic pulse wave velocity; BP: Blood Pressure; BMI: Body Mass Index; STAMPP HTN: Systematic Treatment and Management of Postpartum Hypertension; CVD: cardiovascular disease; CRP: C-reactive protein; HRQoL: health-related quality of life; cHTN: chronic hypertension; HDP: hypertensive disorders of pregnancy; LDL: levels of low-density lipoprotein; EPDS: Edinburgh Postnatal Depression Scale; PRAMS: Pregnancy Risk Assessment Monitoring System; ALSWH: Australian Longitudinal Study on Women's Health; MHH: Mom's Healthy Heart; ABPM: ambulatory blood pressure measurement; HBPM: home blood pressure measurement; SNAP-HT: Self-Management of Postnatal Hypertension

characteristics of the target population, study design, and outcomes. Further information on the findings of the included studies is available in [Table 2](#). Given the heterogeneity of study designs, interventions, and outcome measures, a formal meta-analysis was not conducted. Instead, a narrative synthesis was employed to integrate findings from diverse methodologies.

RESULTS

A total of 28 study articles were analyzed in this systematic review, all of which were published between 2019 and 2024. The reviewed articles originated from studies conducted across

various regions of the world, including Asia (n=4; 14.28%), Africa (n=3; 10.71%), Europe (n=7; 25%), America (n=12; 42.86%), and Australia (n=2; 7.14%). Only three articles with a qualitative study design were analyzed in this review ([Arntzen et al., 2023](#); [Rossiter et al., 2022](#); [Silverio et al., 2023](#)). There were five articles with a randomized controlled trial (RCT) study design ([Arkerson et al., 2023](#); [Kitt et al., 2021](#); [Kordvarkane et al., 2023](#); [Riemer et al., 2021](#); [Saranjam et al., 2023](#)). There were three articles that utilized a cross-sectional study design ([Burgess et al., 2021](#); [Slater et al., 2023](#); [Sutherland et al., 2020](#)). Two articles employed a mixed-methods study design ([Cairns et al., 2020](#); [Mooij et al., 2021](#)),

one article used a quasi-experimental study design (Rajabloo et al., 2021), and eight articles adopted a prospective cohort study design (Ackerman-Banks et al., 2022; Hacker et al., 2022; Jikamo et al., 2022; Keepanasseril et al., 2020; Magnus et al., 2023; Moustafa et al., 2024; Ntlemo et al., 2021; Scholz et al., 2022). Additionally, five articles utilized a retrospective cohort study design (Girsen et al., 2022; Lewey et al., 2020; Lovgren et al., 2023; Romagano et al., 2020; Triebwasser et al., 2021), and one article employed a case-control study design (Nuckols et al., 2022). The total number of samples included across all reviewed studies was 6,081,690.

DISCUSSION

This review emphasizes that the risk of developing hypertension is significantly high among women with a history of preeclampsia in previous pregnancies, highlighting the need for special attention in postpartum management. The large total sample size in this review indicates broad coverage, providing deeper insights into hypertension prevention among women with a history of preeclampsia. Several reviewed studies recommend both short-term and long-term postpartum care to enhance women's ability to manage the risk of developing hypertension after childbirth (Arkerson et al., 2023; Jikamo et al., 2022; Romagano et al., 2020).

The majority of the studies identified were of the prospective cohort type. This indicates the need for long-term monitoring of women with a history of preeclampsia to effectively manage the risk of hypertension and other future morbidities. A study suggests that the early postpartum period following preeclampsia during pregnancy is a condition that significantly affects maternal well-being (Silverio et al., 2023). In longer-term monitoring (12 months), it was also found that women with a history of hypertension during pregnancy, including preeclampsia, experienced increased levels of HbA1C, LDL, and total cholesterol, which may indicate the presence of metabolic syndrome (Ackerman-Banks et al., 2022).

The presence of five randomized controlled trials in this review indicates efforts to evaluate the effectiveness of postpartum care beyond standard care, particularly during the postpartum period. Several studies are interconnected or involve similar types of postpartum care interventions (Cairns et al., 2020; Kitt et al., 2022; Nuckols et al., 2022; Triebwasser et al., 2021). This indicates that there are still opportunities to conduct experimental research on postpartum care interventions or hypertension prevention programs for women with a history of preeclampsia.

The presence of three qualitative studies and two mixed-methods studies highlights the need to explore the experiences of women with a history of hypertension during pregnancy, including preeclampsia, their postpartum experiences, and their efforts to manage blood pressure. The three qualitative studies identified similar themes related to the need for information about the disease and its risks following a preeclampsia diagnosis. A consistent subtheme across these studies was a lack of knowledge, which ultimately led to anxiety and a sense of losing control over their own health (Amtzen et al., 2023; Rossiter et al., 2022; Silverio et al., 2023). The two mixed-methods studies in this review also confirmed the importance of information, showing that participants in both studies expressed a desire for a more active role from healthcare professionals in providing information, particularly regarding the long-term effects of hypertension during pregnancy (Cairns et al., 2020; Mooij et al., 2021). Hypertension during pregnancy, particularly severe preeclampsia, is a condition that may occur unpredictably, leaving women feeling unprepared

and overwhelmed when facing its consequences. The role of healthcare professionals in providing information and continuous monitoring can help women better understand their condition and adapt to the changes and potential risks in the postpartum period and beyond.

One case-control study and one quasi-experimental study examined postpartum care programs and follow-ups in smaller populations. The positive outcomes from both studies indicated that providing education, regular follow-ups, and self-monitoring blood pressure skills improved blood pressure outcomes (Nuckols et al., 2022; Rajabloo et al., 2021). Studies on smaller and more specific populations may be necessary, as some research has found that race, ethnicity, and socioeconomic conditions influence health behaviors, angiogenic and antiangiogenic protein factors, as well as the pathogenesis of preeclampsia and hypertension (Arkerson et al., 2023; Palmer & Das, 2020). Studies conducted in more specific settings with limited sample sizes can serve as a foundation for developing postpartum care before its implementation in broader populations. Additionally, testing postpartum care interventions on specific sample characteristics allows for a tailored intervention approach, enabling personalized and effective care that meets the needs of participants—in this case, women with a history of preeclampsia or other types of hypertension during pregnancy.

CONCLUSION

The findings of this review confirm that women with a history of preeclampsia, particularly severe cases, are at high risk of developing maternal hypertension and chronic hypertension. Appropriate postpartum care, both short-term and long-term, is essential to minimize the occurrence of hypertension and reduce the risk of rehospitalization due to hypertension-related complications. Postpartum care provided to women with a history of preeclampsia should be distinguished from the standard care given to those without such a history. Trials of postpartum care beyond standard care can also be conducted using a tailored-made intervention approach, designed for more specific settings and sample populations to ensure effectiveness and personalization of care. This approach ensures that the postpartum care being tested aligns with the specific needs of women. Continuous follow-up by healthcare professionals is essential to provide women with a history of preeclampsia the information and support they need to manage their hypertension risk. Follow-up care from healthcare providers can be delivered through in-person counseling as well as telehealth monitoring, offering flexibility and accessibility in postpartum care management.

Declaration of Interest

This systematic review has no conflict of interest.

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Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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